SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Beaver, Minnehaha County
LBS-Lake-70-000
2021

Lake Information

Name:	Beaver	**Maximum Depth:**	11 Feet
County:	Minnehaha	**Mean Depth:**	9 Feet
Legal Description:	T102N-R52W-Sec. 14,15	**OHWM Elevation:**	1,652
Surface Area:	372 Acres	**Outlet Elevation:**	1,652

Surveys and Investigations

Survey methods used by gear type, date, and effort.

Gear	Date	Effort
AFS std gill net	May 17, 2021	6 net-nights
frame net (std 3/4 in)	May 17, 2021	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Black Crappie

Black Bullhead

Northern Pike

Common Carp

Green Sunfish

Terminology

Catch per unit effort (**CPUE**) refers to the relative abundance of a species. It is defined as the number of fish captured per unit of effort (i.e., number of fish captured per net-night or number of fish captured per hour electrofishing). In this report CPUE is typically given for only stock-length fish (see length categories table for stock lengths).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- s**td experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

$$CPUE = \frac{number\ of\ fish}{effort}$$

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of\ fish \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

Relative weight (**Wr**) is used to quantify fish plumpness. Relative weight is the ratio of what a fish weighs (W) compared to a length-specific standard weight (Ws) multiplied by 100. Relative weight values of 95-105 are commonly cited as optimum values, but values in the 80s are common during summer sampling in South Dakota.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

Confidence intervals (**CI**) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (**S**), quality (**Q**), preferred (**P**), memorable (**M**) and trophy (**T**). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Walleye	10	25	15	38	20	51	25	63	30	76
White Bass	6	15	9	23	12	30	15	38	18	46
White Crappie	5	13	8	20	10	25	12	30	15	38
Yellow Bullhead	4	10	7	18	9	23	11	28	14	36
Yellow Perch	5	13	8	20	10	25	12	30	15	38

Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

*** Methods/Species that ignore stock length**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	81	13.5	5.5	91	5	0		84	1
	Common Carp	11	1.8	0.8	100		73			
	Northern Pike	16	2.7	0.9	100		25		90	3
	Walleye	1	0.2	0.2	100		0		74	
	Yellow Perch	12	2.0	0.7	0		0		83	5
frame net (std 3/4 in)	Black Bullhead	75	18.8	20.2	63	8	0		83	2
	Black Crappie	240	60.0	20.8	17	3	10	3	109	1
	Green Sunfish	2	0.5	0.8	0		0		114	1
	Northern Pike	3	0.8	0.8	100		67		90	14
	Walleye	11	2.8	2.0	45		9		81	4
	Yellow Perch	4	1.0	0.0	0		0		83	4

10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

*** Methods/Species that ignore stock length**

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std frame net	Black Bullhead						24.3					24.30
	Black Crappie						25.0					25.00
	Common Carp						0.0					0.00
	Green Sunfish						0.3					0.30
	Northern Pike						0.3					0.30
	Orangespotted Sunfish						0.0					0.00
	Walleye						1.0					1.00
	Yellow Perch						0.8					0.80
AFS std gill net	Black Bullhead						4.8	5.2	6.8		13.5	7.58
	Black Crappie						0.0	0.5	0.2		0.0	0.18
	Common Carp						7.5	8.3	8.8		1.8	6.60
	Green Sunfish						0.0	0.2	0.0		0.0	0.05
	Northern Pike						3.3	2.2	1.5		2.7	2.43
	Walleye						9.3	6.0	10.3		0.2	6.45
	Yellow Perch						3.8	1.2	0.2		2.0	1.80
frame net (std 3/4 in)	Black Bullhead		689.3	740.0	72.0	6.2		248.2	88.6		18.8	266.16
	Black Crappie		0.3	0.0	0.0	0.2		58.8	49.4		60.0	24.10
	Common Carp		0.0	0.2	1.0	10.2		3.4	22.2		0.0	5.29
	Green Sunfish		0.0	0.0	0.0	0.0		0.4	0.0		0.5	0.13
	Northern Pike		0.3	1.0	0.0	0.4		1.4	0.8		0.8	0.67
	Walleye		0.3	1.0	0.0	1.2		3.4	0.6		2.8	1.33
	Yellow Perch		0.0	0.0	0.2	0.6		0.8	0.4		1.0	0.43
std exp gill net	Black Bullhead		129.7	74.0	19.0	7.7						57.60
	Common Carp		0.0	0.0	4.0	14.7						4.68
	Northern Pike		2.0	1.0	0.3	0.7						1.00
	Orangespotted Sunfish		0.0	0.0	0.0	0.0						0.00
	Walleye		2.0	6.3	1.7	13.7						5.93
	Yellow Perch		0.3	7.7	14.3	24.0						11.58

10-Year Size Structure and Condition Statistics by Gear and Species

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years.

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std frame net	Black Bullhead	PSD						19				
		PSD-P						13				
	Black Crappie	PSD						29				
		PSD-P						11				
		Wr						112				
	Common Carp	PSD						0				
		PSD-P						0				
	Green Sunfish	PSD						100				
		PSD-P						0				
	Northern Pike	PSD						0				
		PSD-P						0				
		Wr						90				
	Walleye	PSD						100				
		PSD-P						0				
		Wr						88				
	Yellow Perch	PSD						67				
		PSD-P						0				
		Wr						83				
AFS std gill net	Black Bullhead	PSD						63	23	15		91
		PSD-P						32	3	0		0
		Wr										84
	Black Crappie	PSD						0	33	100		
		PSD-P						0	0	100		
		Wr							98	110		
	Common Carp	PSD						63	36	66		100
		PSD-P						10	4	2		73
	Green Sunfish	PSD							0			
		PSD-P							0			
	Northern Pike	PSD						38	85	89		100
		PSD-P						15	8	22		25
		Wr						96	82	89		90
	Walleye	PSD						68	86	74		100
		PSD-P						8	6	10		0

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Walleye	Wr						96	93	99		74
	Yellow Perch	PSD						100	29	100		0
		PSD-P						13	0	100		0
		Wr						86	90	87		83
frame net (std 3/4 in)	Black Bullhead	PSD		97	100	85	87		7	6		63
		PSD-P		4	4	65	65		2	1		0
		Wr		93								83
	Black Crappie	PSD		100		0	0		47	72		17
		PSD-P		67		0	0		31	62		10
		Wr		105			115		108	119		109
	Common Carp	PSD			100	0	75		71	82		
		PSD-P			0	0	2		53	16		
		Wr			117							
	Green Sunfish	PSD							100			0
		PSD-P							0			0
		Wr										114
	Northern Pike	PSD		100	100		100		57	50		100
		PSD-P		33	80		100		0	0		67
		Wr		77	81		131		91	83		90
	Walleye	PSD		100	100	0	33		94	67		45
		PSD-P		0	0	0	17		24	0		9
		Wr		97	92		89		93	98		81
	Yellow Perch	PSD				100	33		75	100		0
		PSD-P				0	33		0	50		0
		Wr				110	114		92	90		83
std exp gill net	Black Bullhead	PSD		96	100	88	91					
		PSD-P		1	7	65	52					
		Wr		97								
	Common Carp	PSD				0	52					
		PSD-P				0	0					
	Northern Pike	PSD		83	100	100	50					
		PSD-P		50	67	0	50					
		Wr		84	90	85	117					
	Walleye	PSD		33	79	100	2					
		PSD-P		33	11	40	2					
		Wr		89	97	93	91					

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
std exp gill net	Yellow Perch	PSD		100	0	93	6					
		PSD-P		0	0	2	6					
		Wr		115	99	111	124					

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2014	29	135 (29)									

Fish Condition

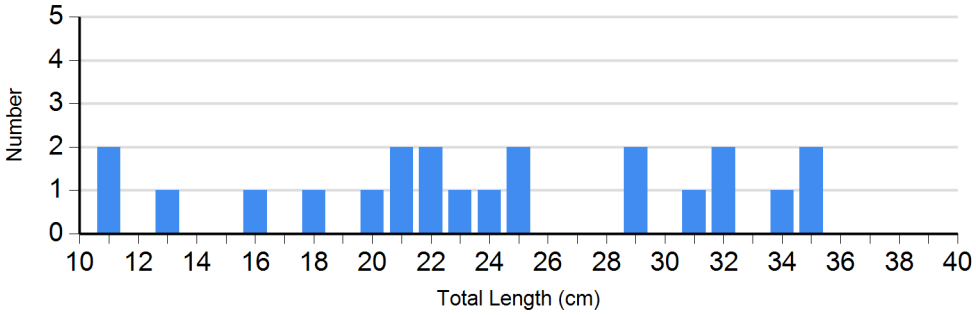
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2021	7	87 (2.2)	74	83 (1.1)	0		0	
Black Crappie Frame Net	2017	71	109 (2.5)	18	122 (2.9)	8	112 (3.1)	3	97 (3.8)
	2018	155	110 (2.4)	47	106 (1.3)	92	93 (0.4)	0	
	2019	69	128 (4.0)	24	124	153	117 (1.1)	1	
	2021	199	111 (1.0)	18	102 (2.5)	16	95 (1.9)	7	92 (1.9)
Northern Pike Gill Net	2017	8	95 (2.2)	3	104 (2.1)	1	88	1	83
	2018	2	75 (2.7)	10	84 (3.0)	1	78	0	
	2019	1	92	6	88 (2.6)	2	91 (0.6)	0	
	2021	0		12	88 (2.3)	4	96 (3.5)	0	
Walleye Gill Net	2017	12	99 (1.9)	22	94 (1.1)	3	96 (7.2)	0	
	2018	5	98 (2.6)	29	92 (1.1)	2	93 (0.5)	0	
	2019	16	105 (0.9)	40	97 (1.1)	6	95 (3.3)	0	
	2021	0		1	74	0		0	
Yellow Perch Gill Net	2017	0		13	86 (1.5)	1	86	1	92
	2018	5	90 (2.9)	2	89 (6.7)	0		0	
	2019	0		0		1	87	0	
	2021	12	83 (3.6)	0		0		0	

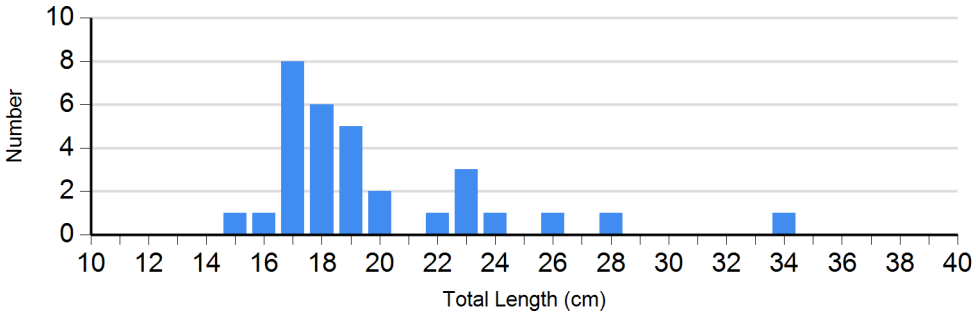
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net



2017



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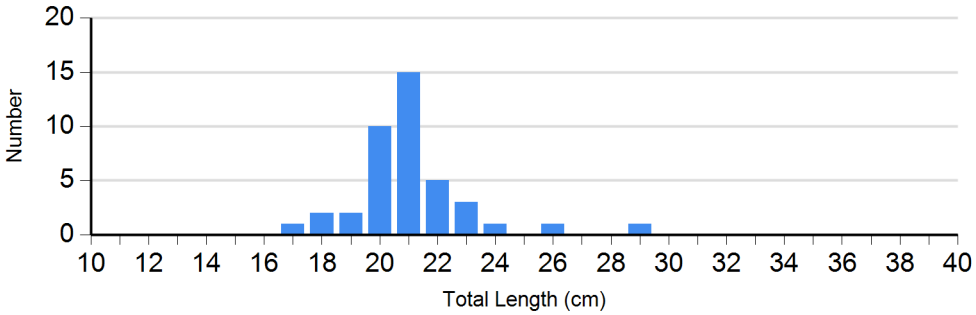

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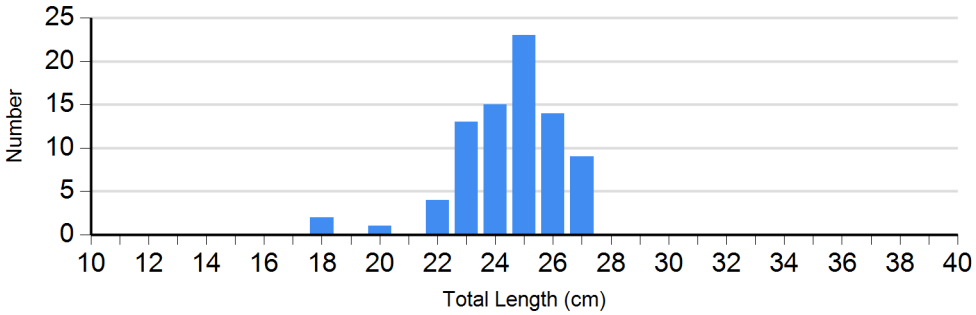
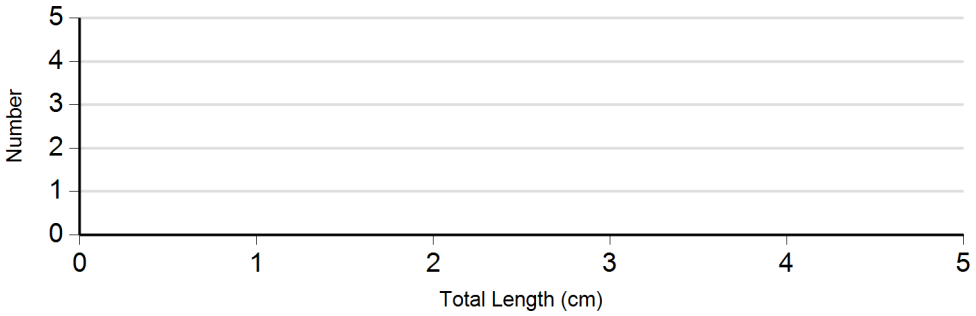


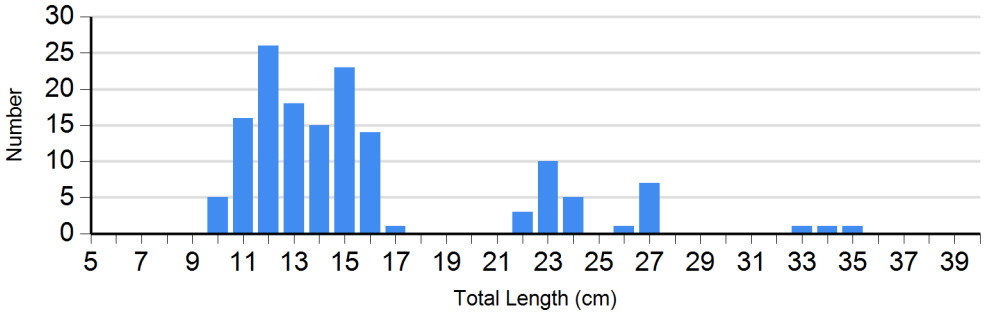
2021

Species: Black Bullhead
Gear: std exp gill net



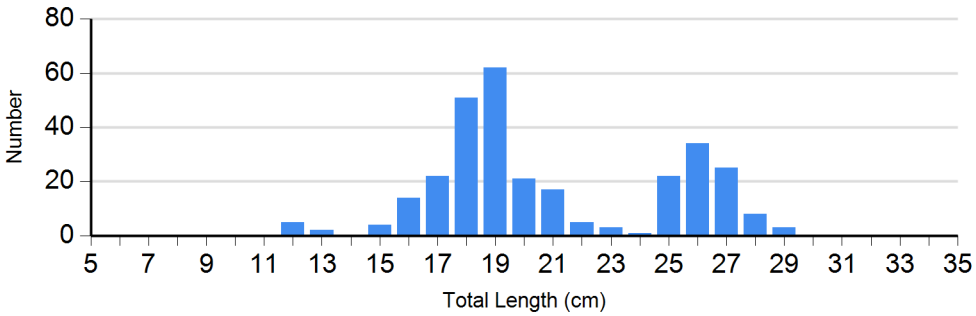
2016

Species: Black Crappie
Gear: AFS std frame net



2017

Species: Black Crappie
Gear: frame net (std 3/4 in)



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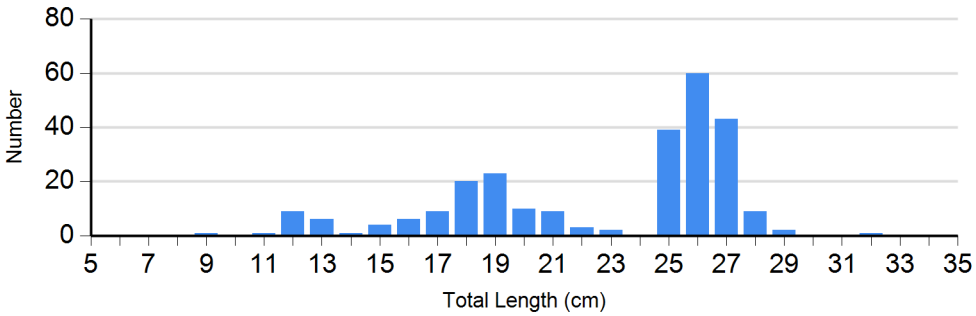
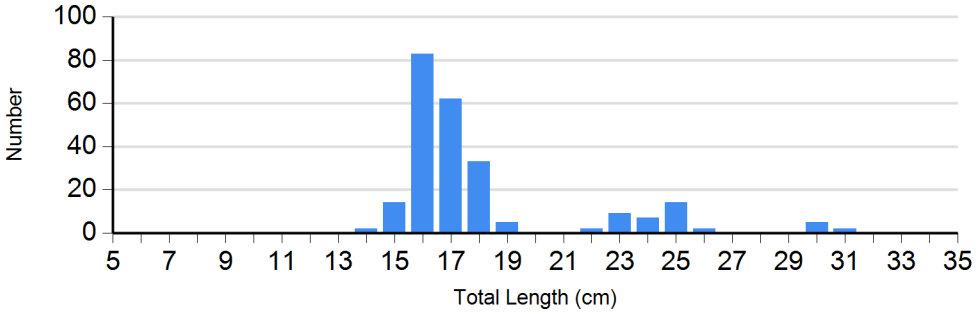
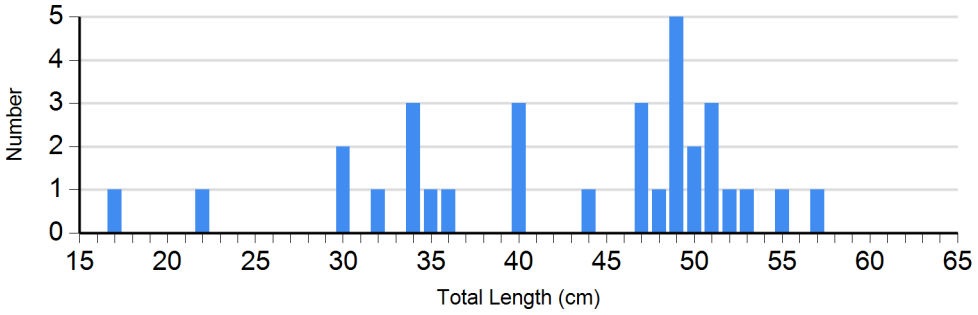


2019



2021

Species: Common Carp
Gear: AFS std gill net



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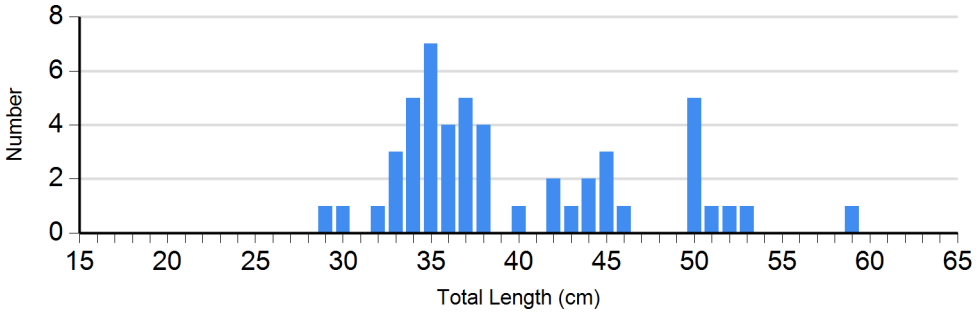

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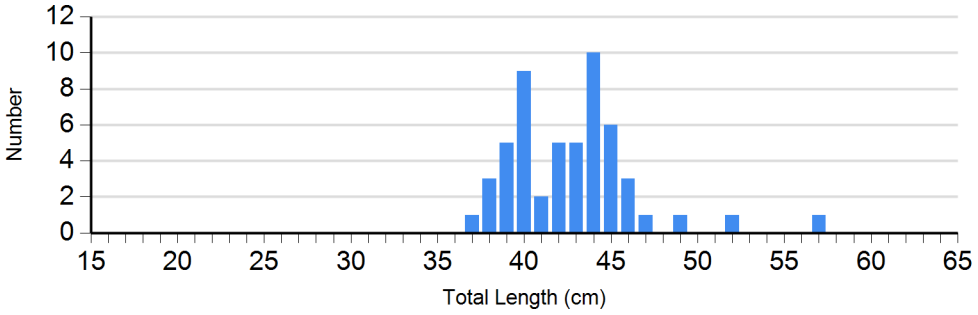

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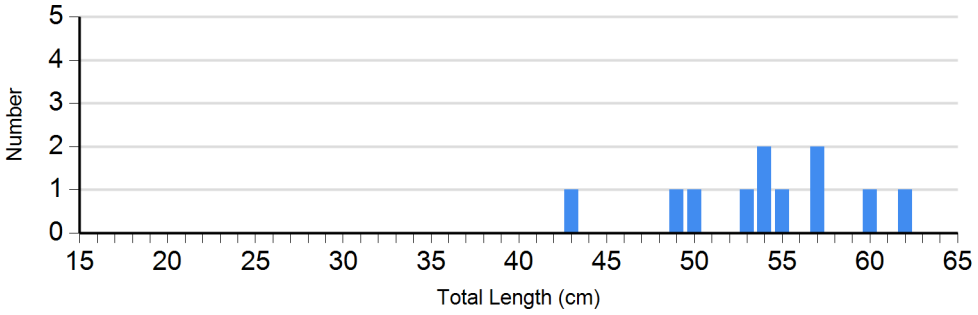
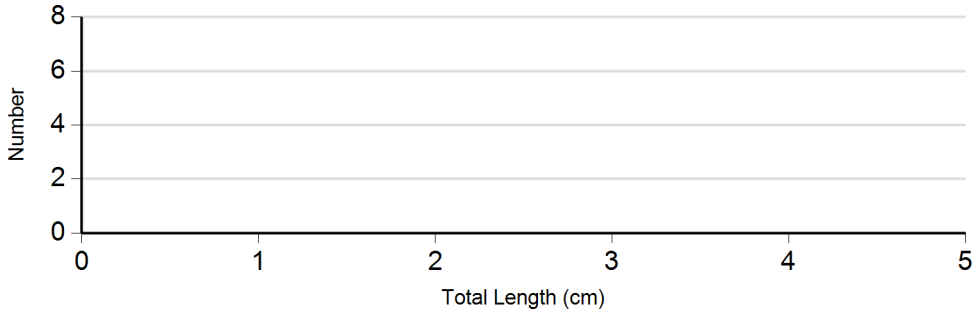


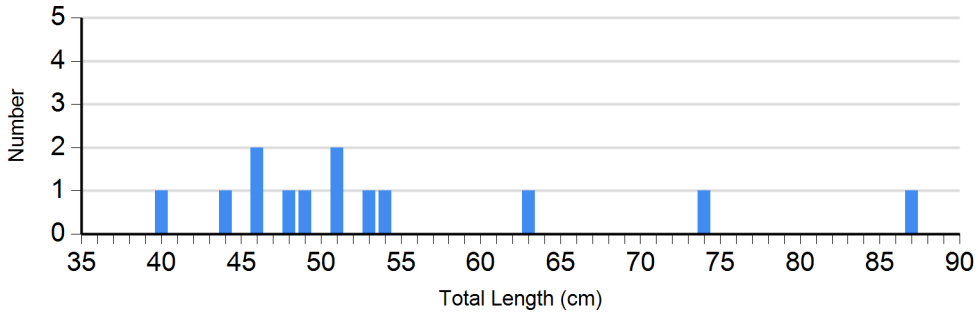
2021

Species: Common Carp
Gear: std exp gill net



2016

Species: Northern Pike
Gear: AFS std gill net



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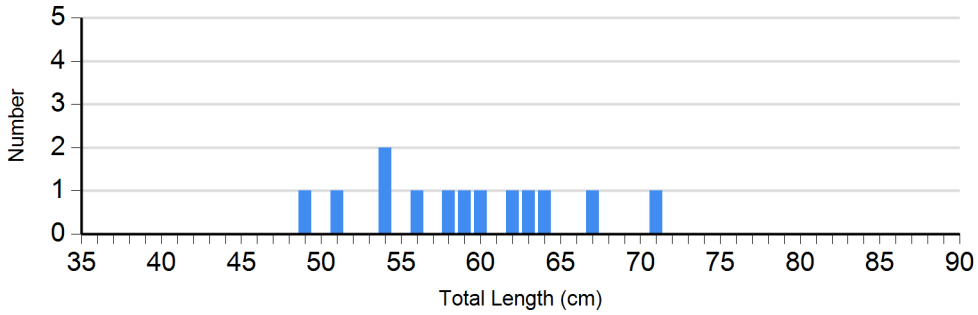

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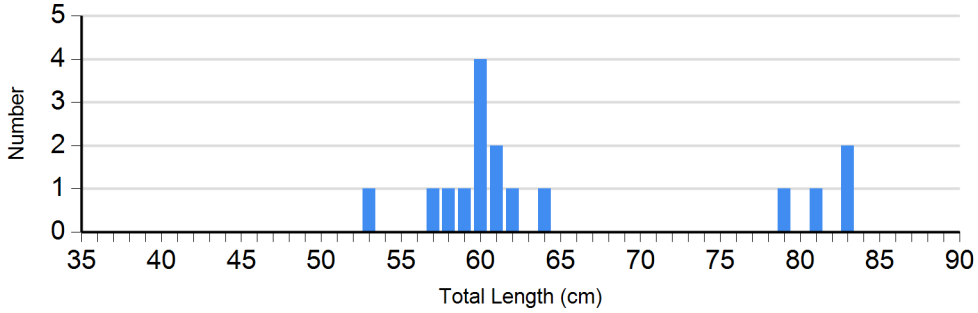
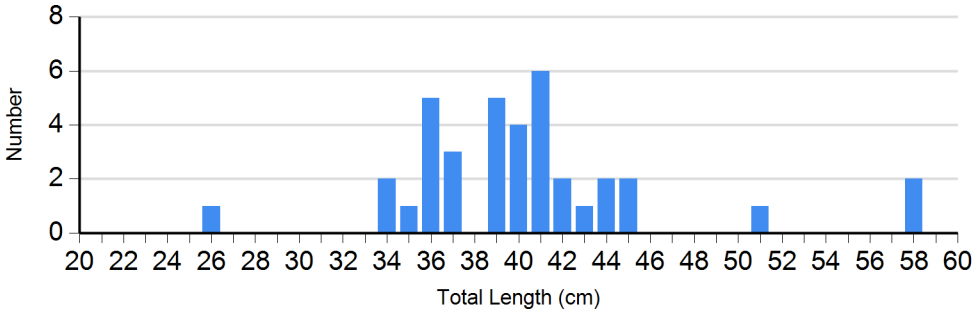


2021

Species: Walleye
Gear: AFS std gill net



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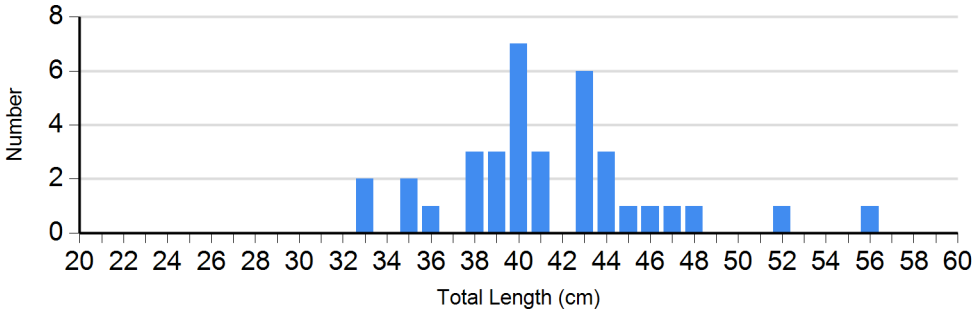

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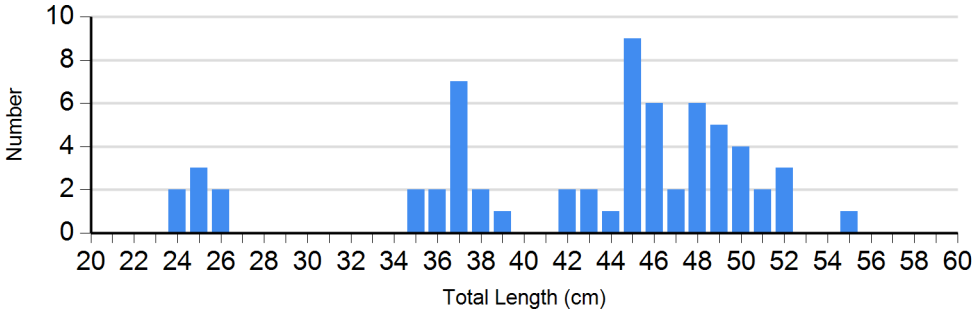

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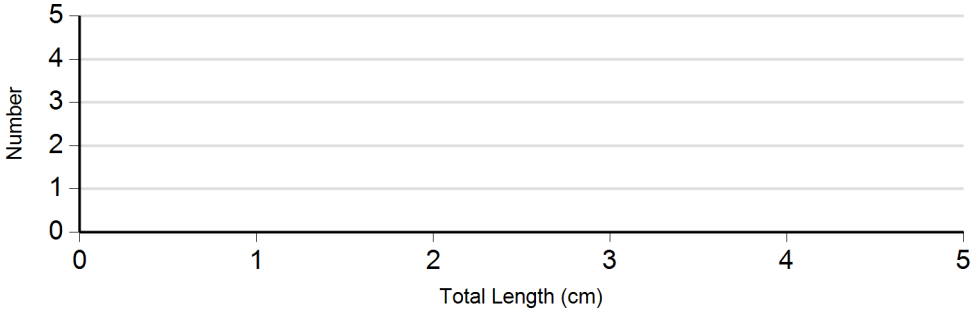
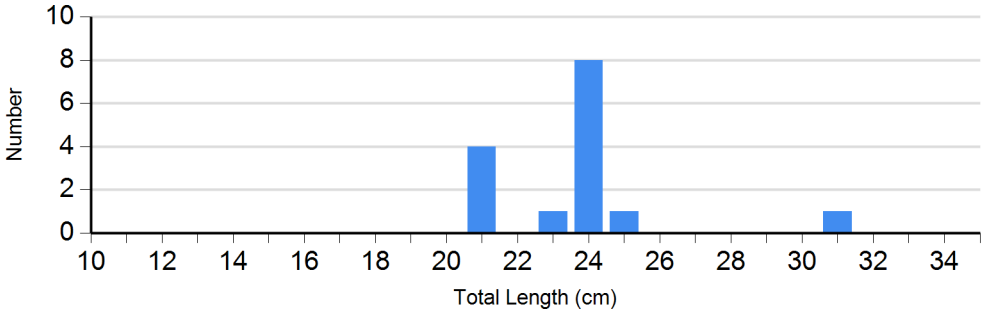
Species: Walleye
Gear: std exp gill net

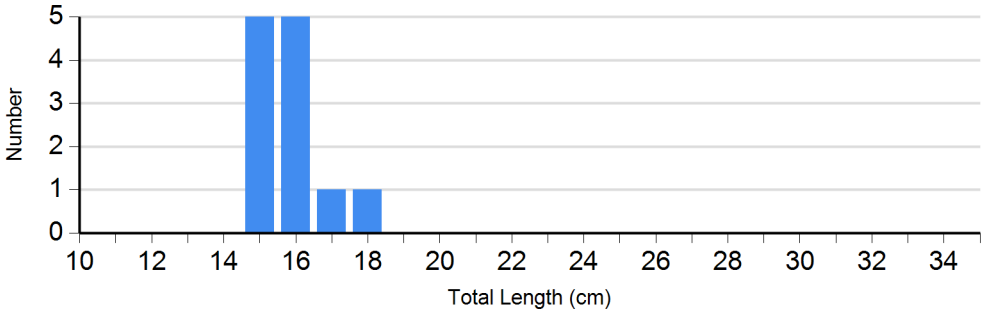


2016

Species: Yellow Perch
Gear: AFS std gill net

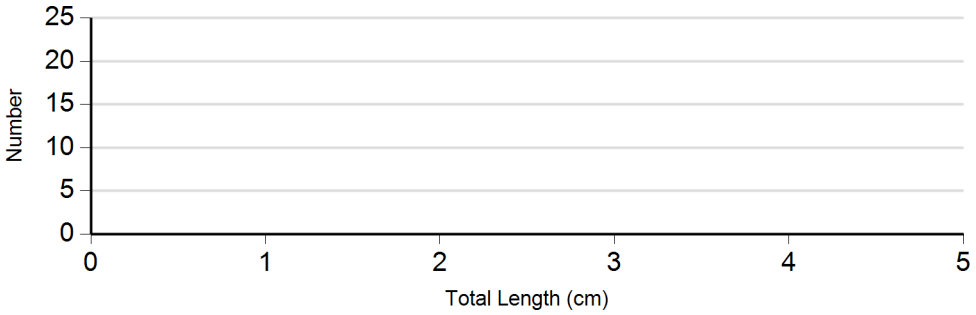


2017



2021

Species: Yellow Perch
Gear: std exp gill net

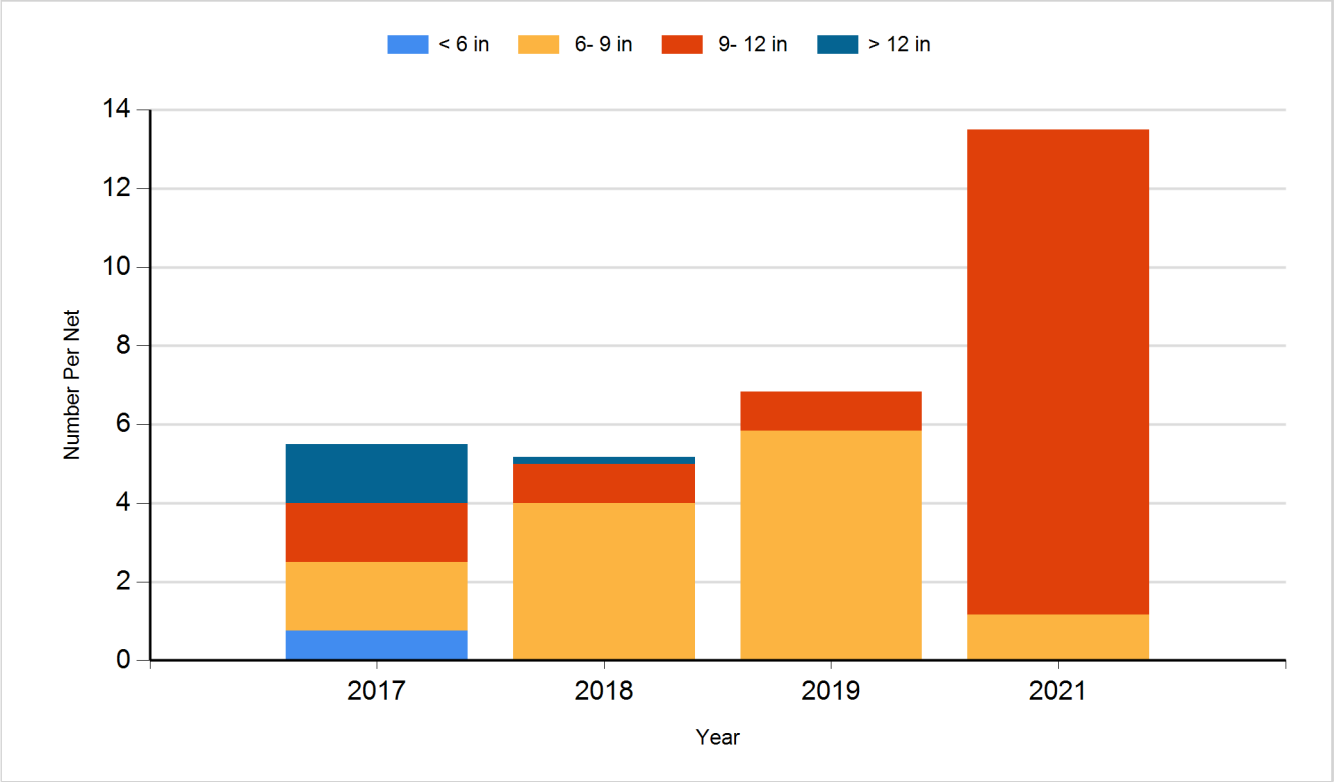


2016

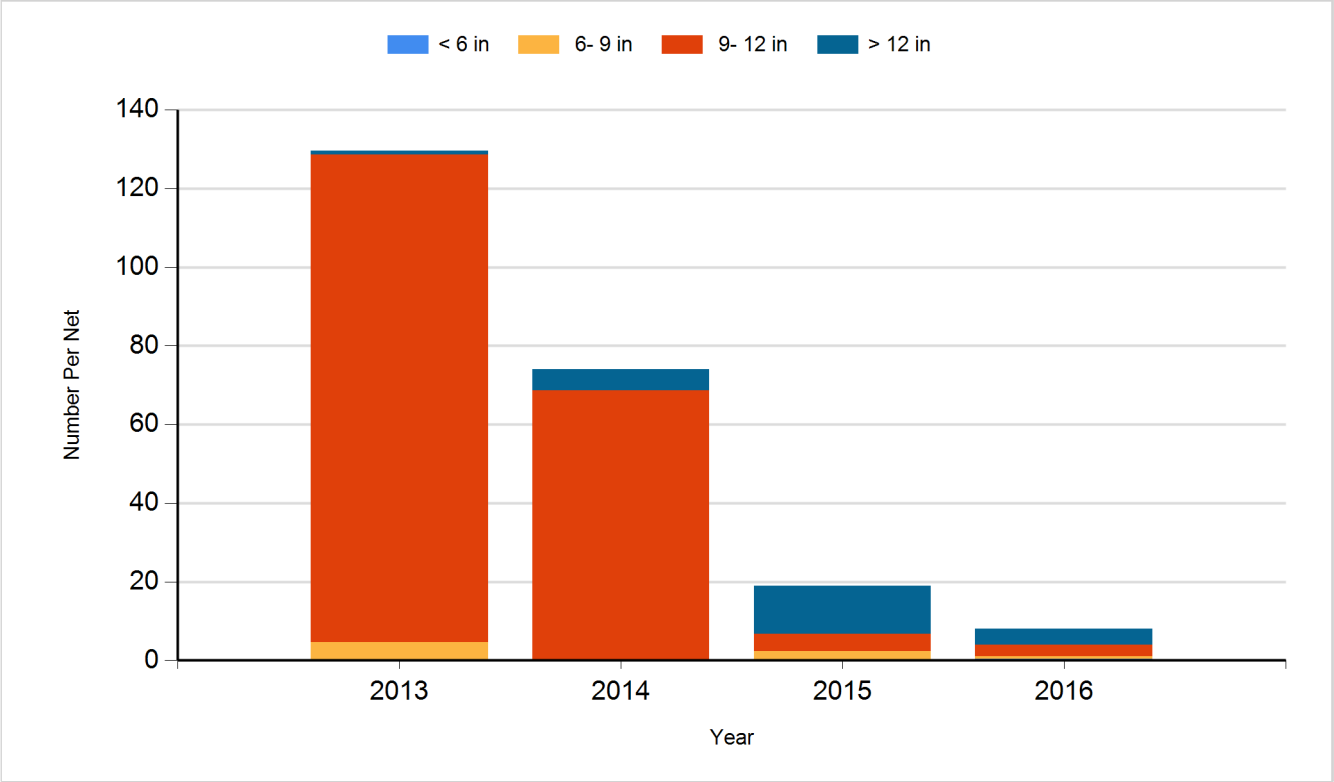
Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.

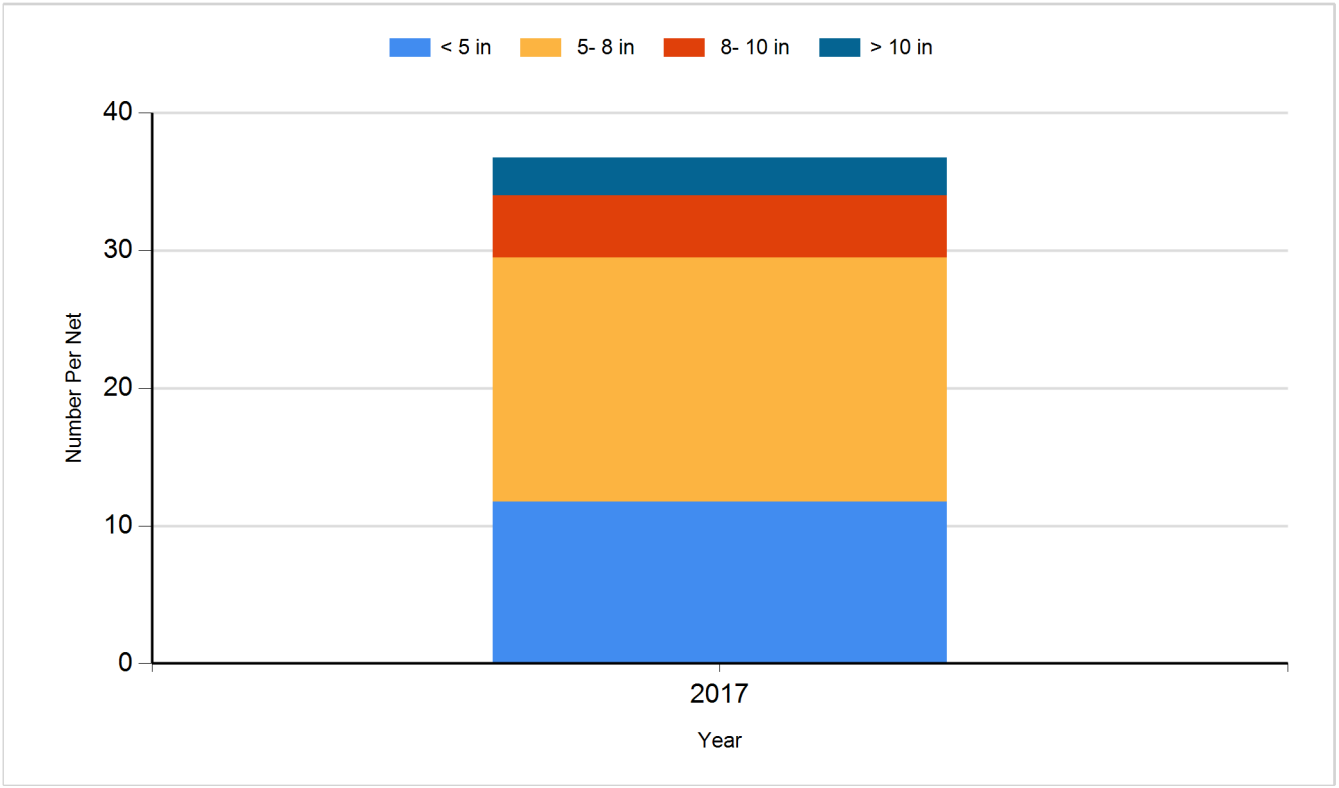
Species: Black Bullhead
Gear: AFS std gill net



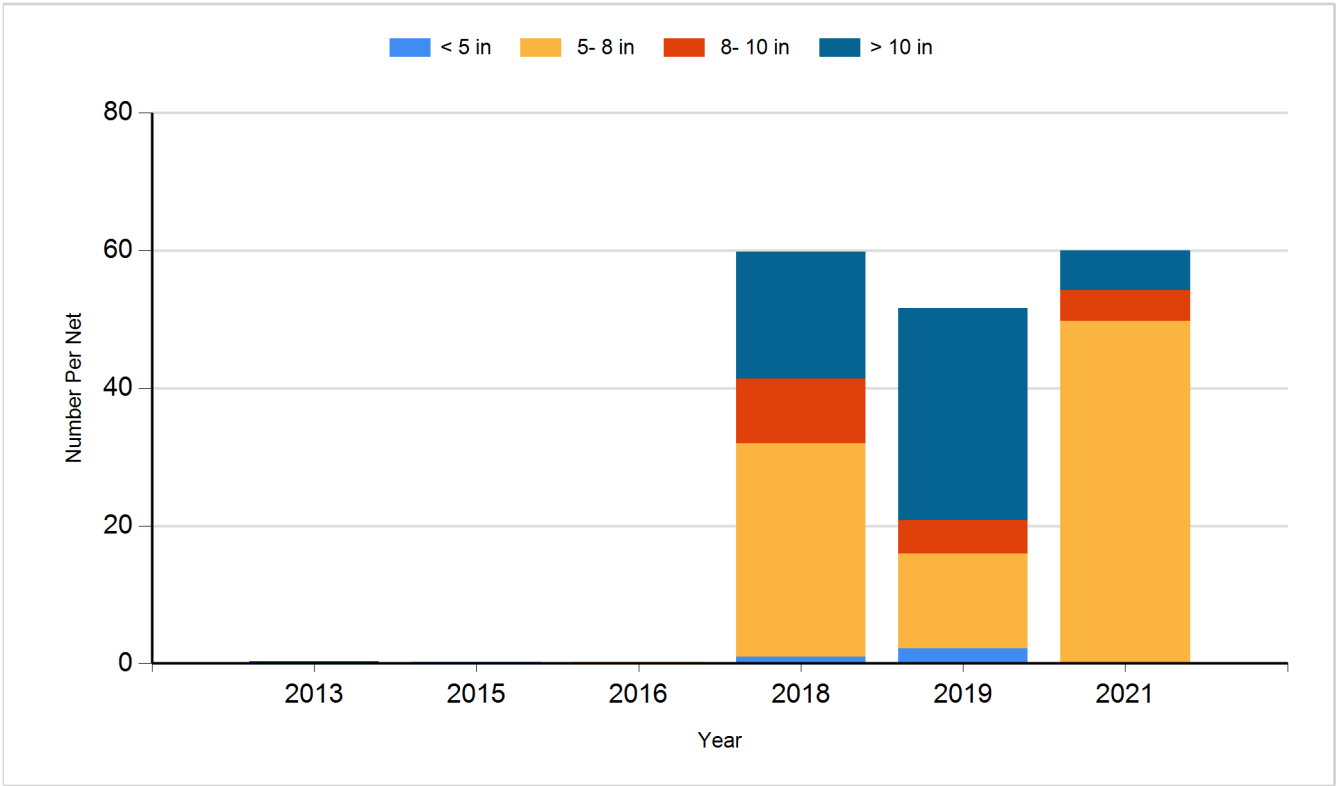
Species: Black Bullhead
Gear: std exp gill net



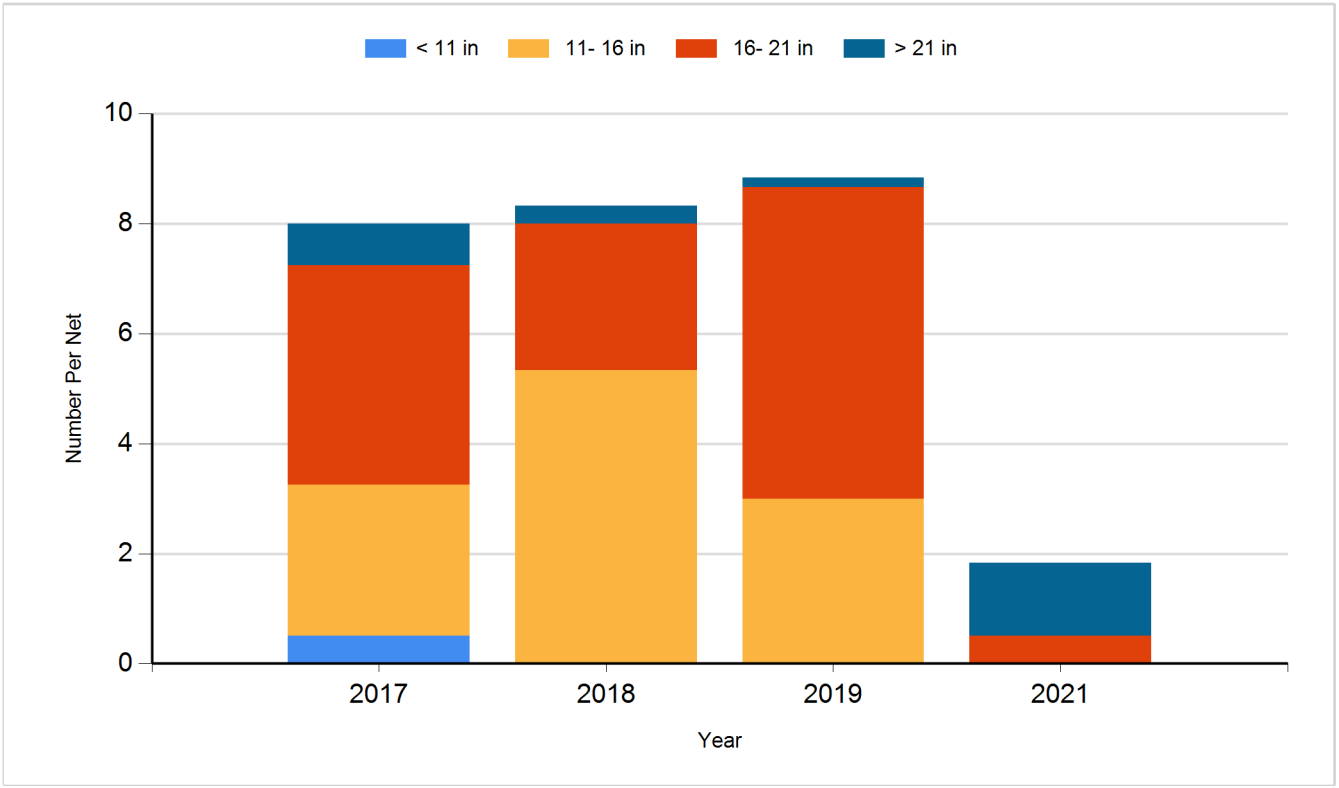
Species: Black Crappie
Gear: AFS std frame net



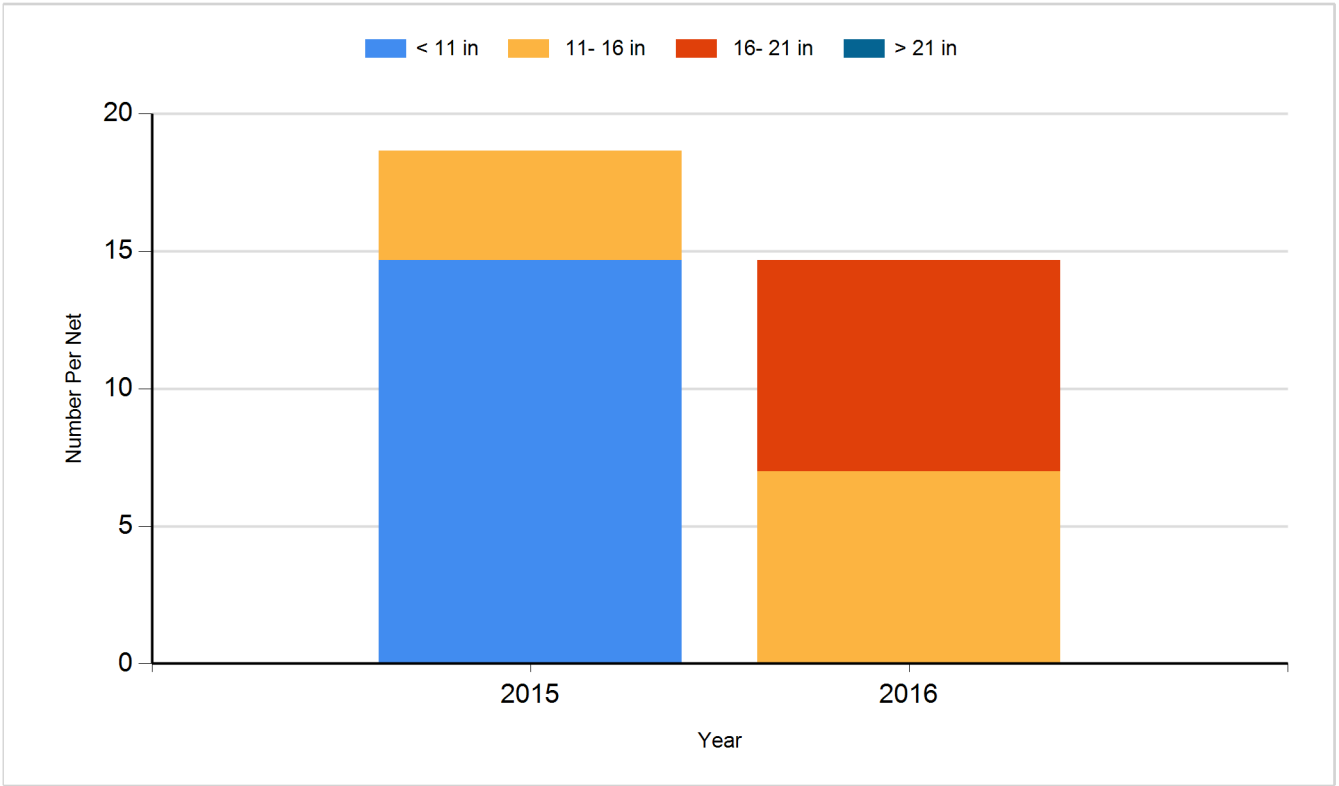
Species: Black Crappie
Gear: frame net (std 3/4 in)



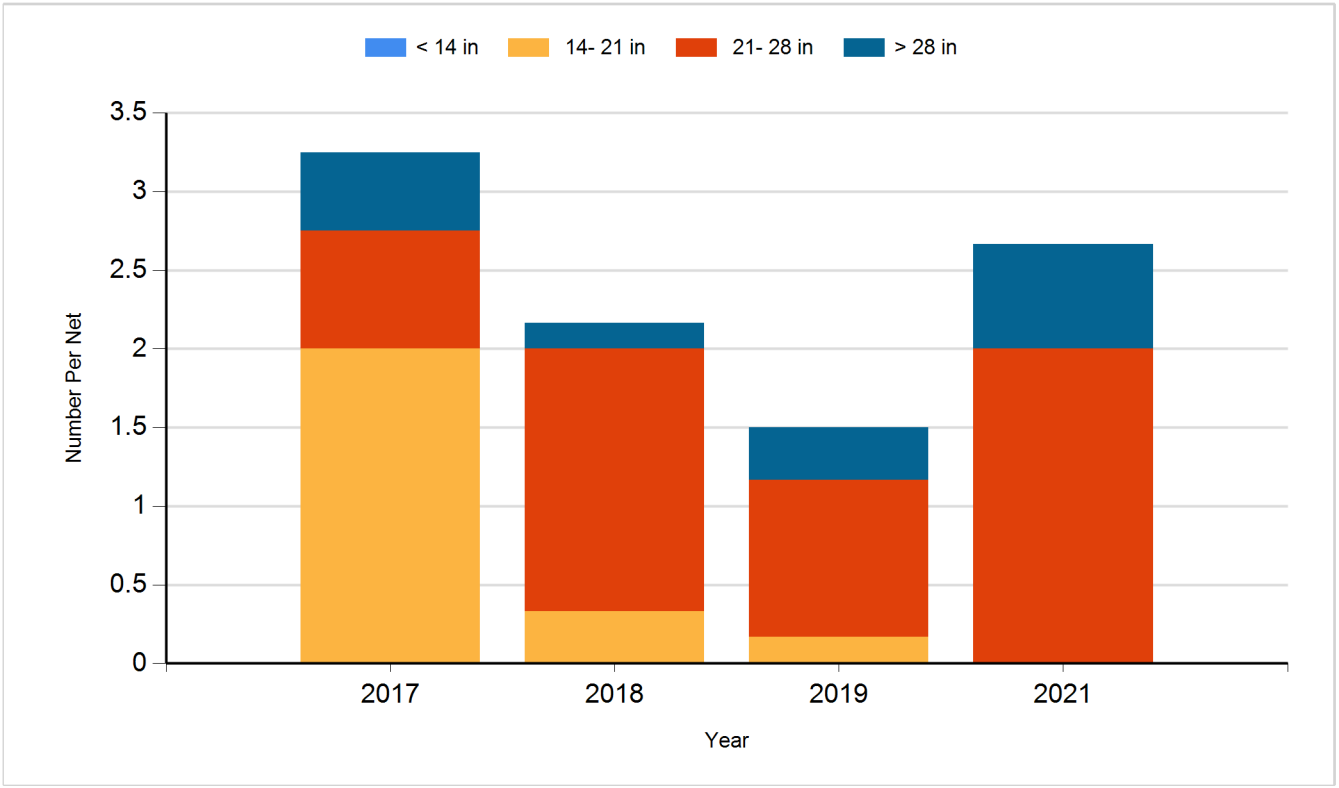
Species: Common Carp
Gear: AFS std gill net



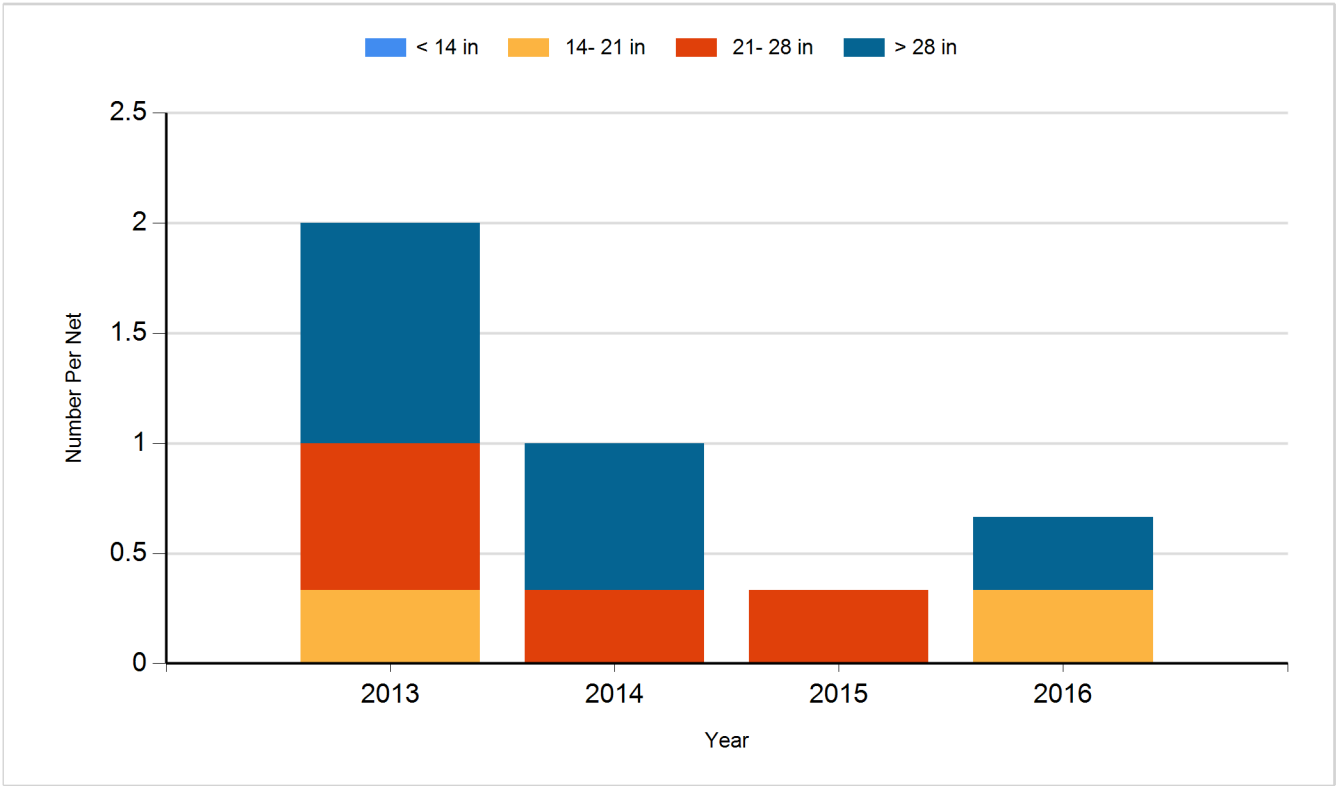
Species: Common Carp
Gear: std exp gill net



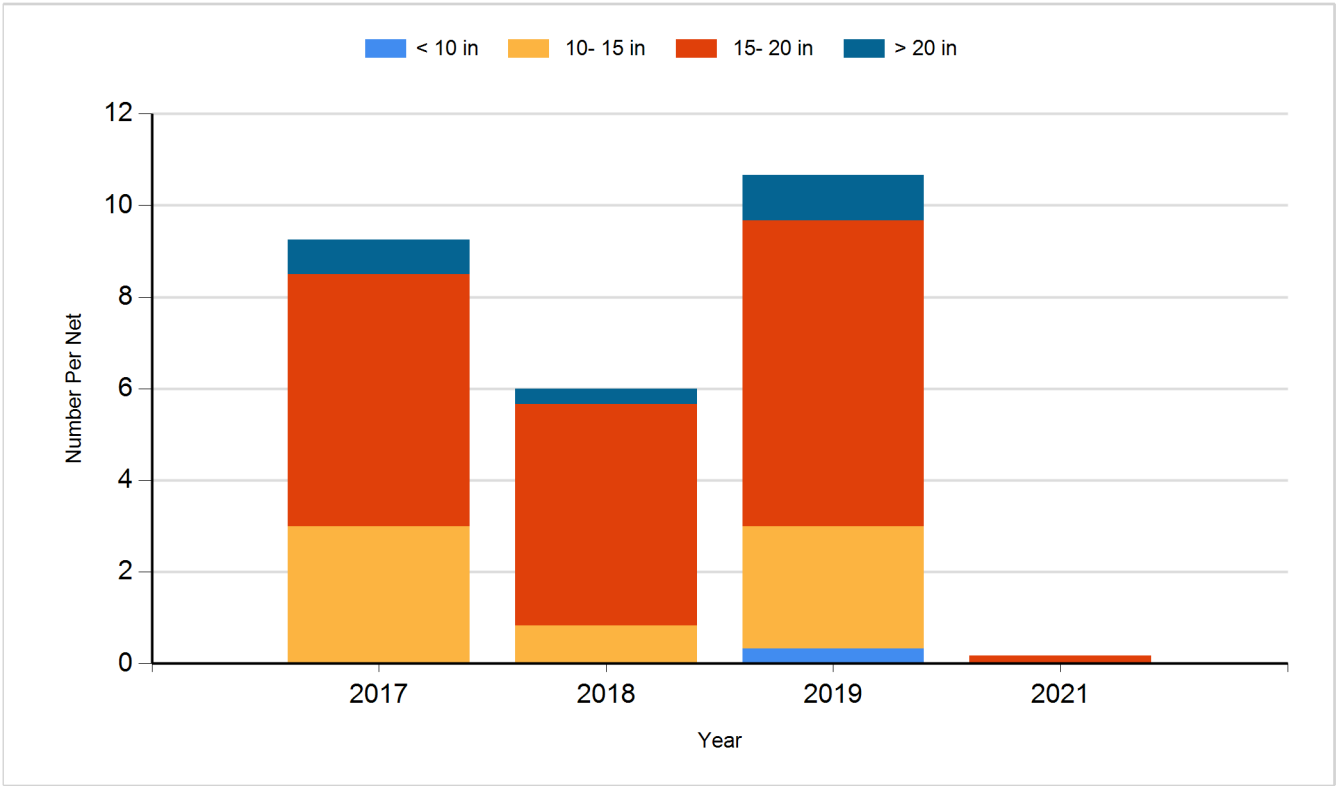
Species: Northern Pike
Gear: AFS std gill net



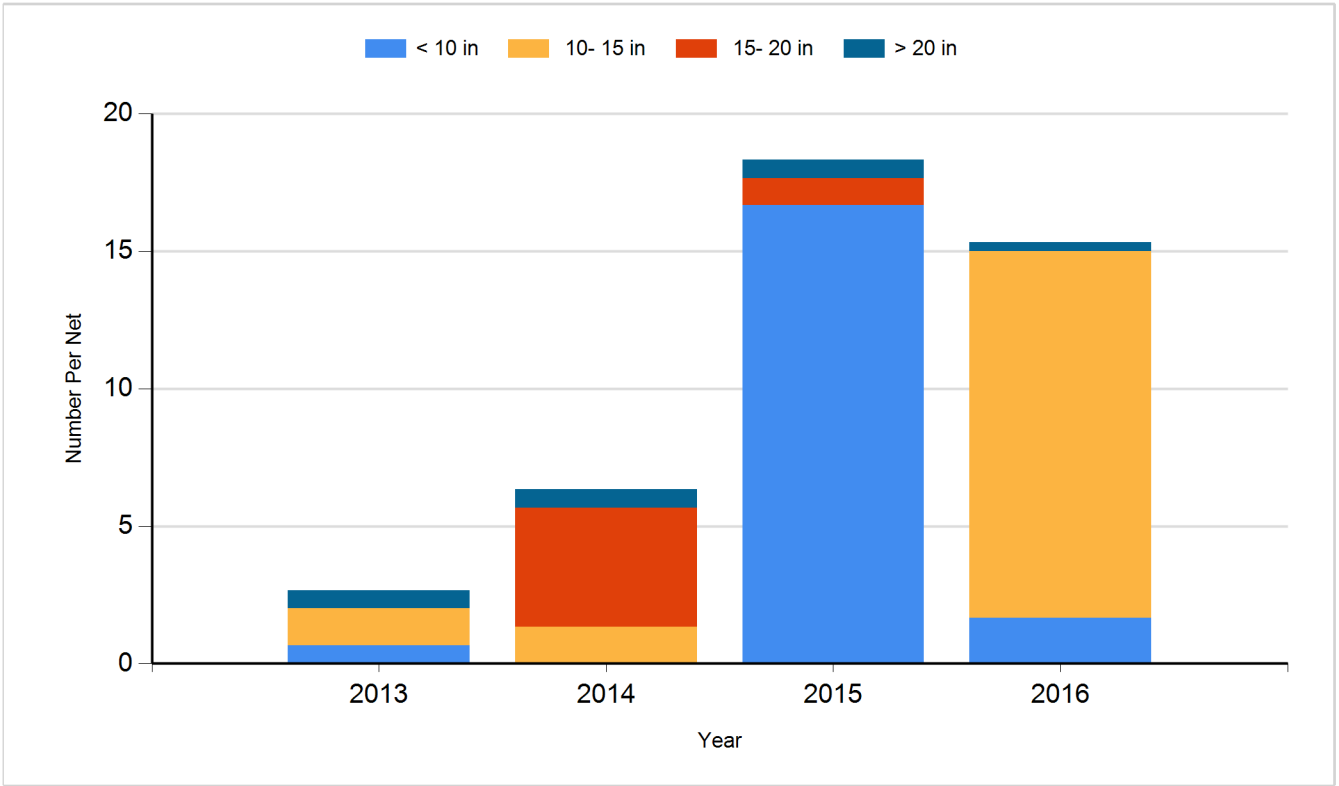
Species: Northern Pike
Gear: std exp gill net



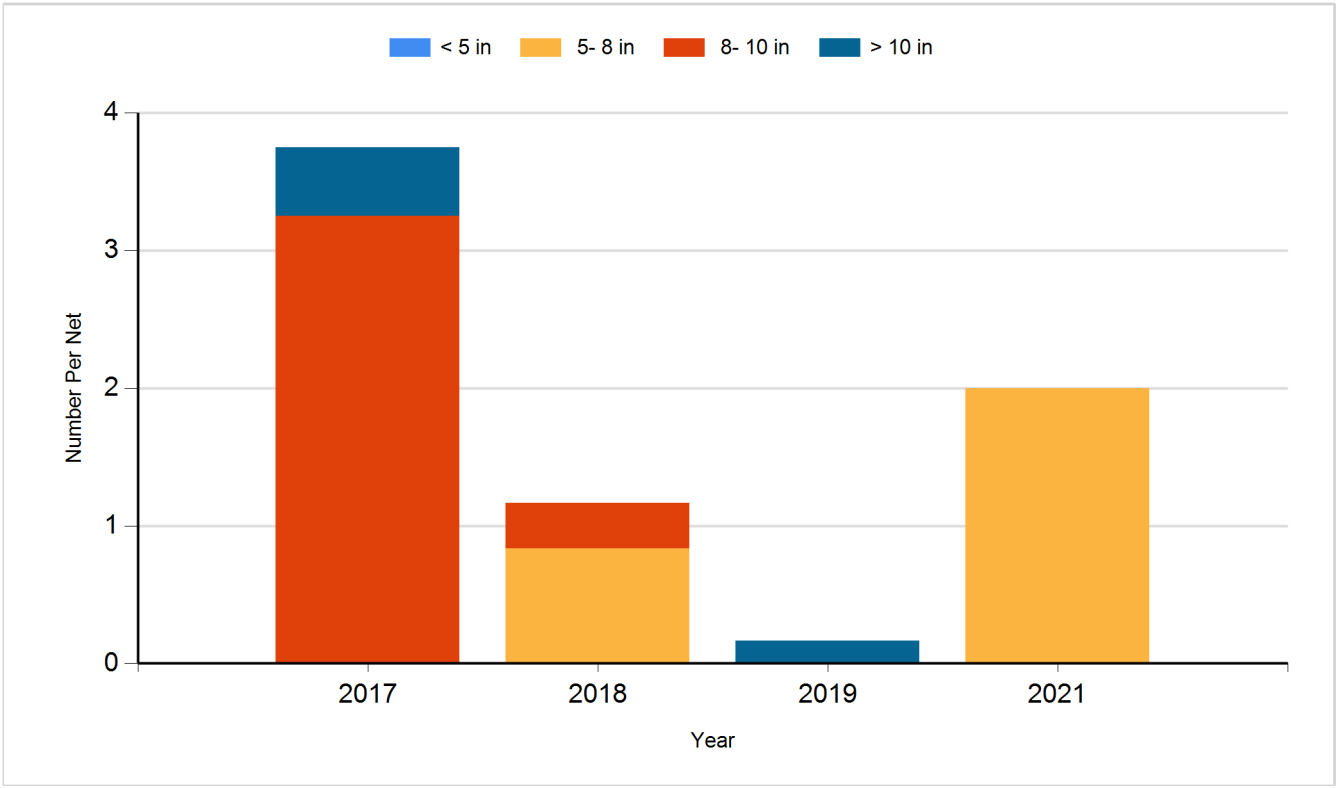
Species: Walleye
Gear: AFS std gill net



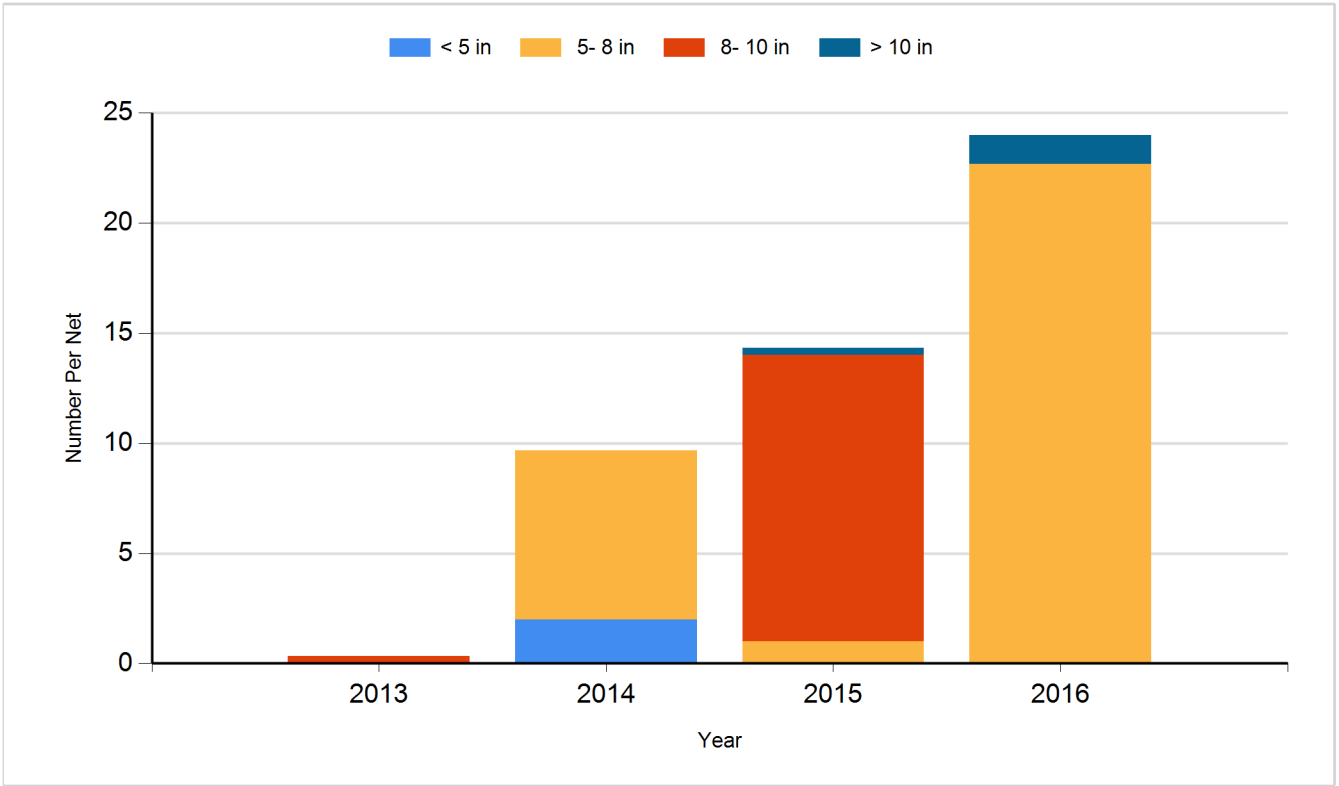
Species: Walleye
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2010	Walleye	Juvenile	500
2010	Walleye	Small Fingerling	27,000
2011	Walleye	Small Fingerling	29,900
2012	Walleye	Small Fingerling	60,500
2012	Yellow Perch	Fingerling	54,670
2013	Yellow Perch	Small Fingerling	161,182
2014	Walleye	Fry	300,000
2015	Walleye	Small Fingerling	21,054
2017	Walleye	Fingerling	21,600
2019	Walleye	Small Fingerling	24,025
2019	Yellow Perch	Fry	160,000
2021	Walleye	Fry	320,000